Unit 1: Back

Dissection Instructions:

Both sides of the cadaver are to be dissected in the same manner unless specific instruction are given to the contrary.

Skin incisions:

- Prior to dissection identify the following structures on the skeleton and on the cadaver.
  1. external occipital protuberance
  2. mastoid process
  3. TV 12
  4. sacrum
  5. crest of ilium
  6. posterior superior iliac spine
  7. axilla
  8. deltoid tuberosity of humerus

- make incisions 2-3 mm deep as shown in Figure 1-1
  1. from external occipital protuberance (A) to level of mid sacrum (B): A to B
  2. from external occipital protuberance (A) to mastoid process (C): A to C
  3. from spine of TV 12 (D) to axilla (E) to deltoid tuberosity of humerus (F): D to E to F
  4. sacrum (B) to level of posterior superior iliac spine then along iliac crest (G): B to G

- reflect the skin laterally from the corners of incisions A, B, C & D
  1. skin the entire back as quickly as possible

- in skinning the plane of section is between the skin and superficial fascia
  1. skin - white with yellow spots

**Figure 1-1**

  2. fascia - yellow with white spots
  3. if both white - skin is split - wrong
  4. if both yellow - fascia is split - wrong

- push round probe through reflected skin; check hole created round or slit-like
  1. slit-like - indicates cleavage line
  2. cleavage line: predominant direction of collagen fibers; surgical incisions made parallel to lines
Look at the cutaneous nerves of the back in an atlas, and try to mentally visualize them embedded in the superficial fascia (Plates 170; 4.28). The area of skin innervated by an individual spinal nerve is called a dermatome and is named according to the spinal nerve innervating it. Thus the dermatome at the back of the head is the C2 dermatome (Plates 157; 4.49). There is no C1 dermatome because C1 has no cutaneous branches. Most of the skin of the back is innervated by the posterior primary rami of spinal nerves. The lower cervical posterior primary rami may not have cutaneous branches. L4-5 posterior primary rami do not have cutaneous branches. Compare (Plates 157, 170; 4.28, 4.49) with regard to L4, 5.

Locate a point three-fourths of an inch inferior to the external occipital protuberance and three-fourths of an inch lateral to the mid-line. Dissect in this area for the greater occipital nerve (Plates 171, 4.35, 4.36). It will be found in the tough superficial fascia and should be seen in company with the ascending branch of the occipital artery and vein. The nerve is difficult to recognize and can rarely be found by the beginning dissector IF a scalpel is used for dissection.

In the upper thoracic region, carefully begin to reflect the superficial fascia laterally from the mid-line. Within one-half inch from the mid-line, locate and preserve the cutaneous branches of the posterior primary rami of thoracic nerves and accompanying vessels. Follow three or four of these laterally for two or three inches, then pull their distal ends from the superficial fascia to preserve them. Reflect the rest of the superficial fascia in the entire area which has been skinned.

Clean the borders and superficial surface of the trapezius, latissimus dorsi, and deltoid muscles (Plates 167, 170; 4.28, 6.29, Table 6.4 and figure-p.496). When they have been cleaned, note the direction of muscle fibers. Try to develop a three-dimensional mental picture of them. Note that the trapezius overlaps the latissimus dorsi and that the insertion of the trapezius corresponds to the origin of the deltoid. Do not dissect beyond the upper border of the trapezius or the lateral border of the latissimus dorsi. The origin of the trapezius is from the superior nuchal line, external occipital protuberance, ligamentum nuchae and the spinous processes of CV7 through TV12. The ligamentum nuchae is a sheet of connective tissue attached above to the occipital bone of the skull and to the spinous processes of the cervical vertebrae. It is a mid-line structure which serves for attachment of muscles. It is located in the groove in the mid-line of the back of the neck. Follow the groove inferiorly until you feel a very prominent spinous process. This is the spinous process of CV7, which is known as the vertebra prominens. The insertion of the trapezius is on the lateral third of the clavicle, acromion process and spine of the scapula. Since individual nerve fibers control individual groups of muscle fibers, one can contract a portion of a muscle to accomplish a desired action. Therefore the actions of the trapezius are several, depending on which of its fibers contract. If only its upper fibers contract, it elevates the shoulder. Its middle fibers retract the shoulder. When all of its fibers contract, it rotates the scapula so that the glenoid surface faces upwards. The trapezius acts on the shoulder, but not the shoulder joint since it doesn't cross that joint. After the trapezius has been studied, carefully detach it from its origin on both sides. To do this, carefully dissect under the muscle by elevating the inferior margin, then cut as much of the origin as has been freed. Continue to dissect and cut, dissect and cut, etc., until the entire origin has been cut. The object of dissecting first is to insure that you only cut trapezius. Check to see that the rhomboideus major and minor were not also cut. Free the trapezius to its insertion, being careful not to destroy its nerve and blood supply which descend on its deep surface (Plates 170, 4.28). The trapezius is
innervated by the eleventh cranial nerve, named the accessory nerve, and cervical nerves three and four.

Clean and study the **latissimus dorsi muscle** *(Plates 167; 4.28)*. Note that the latissimus dorsi takes **origin** through a broad flat tendon or **aponeurosis**. This aponeurosis is named the **posterior lamella of the thoracolumbar fascia**. This fascia separates the deep muscles of the back from the superficial muscles. The latissimus dorsi also **arises** from the crest of the ilium and the lower three ribs. The latissimus dorsi **inserts** on the floor of the intertubercular groove of the humerus, but this should not be seen at this time. The latissimus dorsi acts on the shoulder joint, since it crosses that joint. It **extends, adducts and medially rotates the arm**.

Detach the **latissimus dorsi** from its origin in the same manner, cutting through its fleshy fibers where they attach to the posterior lamella of the thoracolumbar fascia *(Plates 167; 4.28)*. Check to see that the **serratus posterior inferior** is not also cut. The nerve and blood supply of the latissimus dorsi come from the axilla and should not be seen at this time. **DO NOT** dissect into the axilla.

Clean the **levator scapulae, rhomboideus major** and **rhomboideus minor** *(Plates 167, 170; 4.28, 4.29)*. Note the direction of their fibers. Note that the insertions of these three muscles are adjacent and continuous along the vertebral border of the scapula, but their origins are not continuous. The origin of the **levator scapulae** is from the transverse processes of the upper four cervical vertebrae and it **inserts** on the vertebral border of the scapula above the level of the scapular spine. The **rhomboideus minor** **arises** from the mid-line in the lower cervical region and **inserts** on the vertebral border of the scapula at the level of the scapular spine. The **rhomboideus major** **arises** in the mid-line in the upper thoracic region and **inserts** on the vertebral border of the scapula below the level of the scapular spine. **On one side only**, detach the rhomboideus major and minor from their origins. Check to see that the **serratus posterior superior** is not cut at the same time. **DO NOT cut the levator scapulae**. Clean the deep surface of the rhomboid muscles and locate their nerve and blood supply. All three muscles receive their nerve and blood supply from the cervical region, reaching their deep surfaces. The upper portion of the levator scapulae is innervated by cervical nerves three and four. The dorsal scapular nerve from cervical nerve five innervates the lower portion of the levator scapulae and both rhomboid muscles.

Clean the surface of the **serratus posterior superior and inferior** *(Plates 167; 4.29)*. They take origin in the mid-line and insert on ribs. Detach the serratus posterior superior from its origin on the side where it was exposed and detach the origin of the serratus posterior inferior from both sides.

Clean the surface of the deep muscles of the back on the side where the rhomboids were cut *(Plates 167, 168; 4.30, 4.32)*. All of the deep muscles of the back are innervated by posterior primary rami. The **origin** of the **splenius capitis and cervicis muscles** is from the spinous processes of vertebrae in the lower cervical and upper thoracic region. The **insertion** of the **splenius capitis** is on the skull near the superior nuchal line and mastoid process while the **splenius cervicis** **inserts** on transverse processes of upper cervical vertebrae. Detach the splenius muscles from their origin and reflect them upward and laterally. Now clean the semispinalis capitis, which lies under the splenius muscles. On the side of the cadaver where the rhomboid muscles are still intact, detach the **semispinalis capitis** from the skull and reflect it downward to expose the semispinalis cervicis muscle. The greater occipital nerve should be kept intact.
Note that the **erector spinae** muscle has three divisions. They are, from medial to lateral, the **spinalis**, the **longissimus** and the **iliocostalis divisions**. Each of these have regional subdivisions (*Plates 168; 4.30; Table 4.4 and figures-pp. 314 & 315).

On the side with the intact rhomboid muscles, detach the erector spinae muscle from its origins off the sacrum, ilium and lumbar vertebrae and reflect it upwards to expose the **transversospinal group of muscles**, the **semispinalis, multifidus** and **rotator muscles** (*Plates 169; 4.31-4.33, Table 4.1-p. 279).

**Be sure to identify all of the following in this unit:**

- external occipital protuberance
- greater occipital nerve
- occipital artery & vein (ascending branch)
- dorsal (posterior) primary rami of thoracic nerve
- trapezius muscle
- latissimus dorsi muscle
- deltoid muscle
- ligamentum nuchae
- thoracolumbar fascia
  - posterior lamella
  - anterior lamella
- serratus posterior inferior muscle
- levator scapulae muscle
- rhomboideus major muscle
- rhomboideus minor muscle
- serratus posterior superior muscle
- splenius capitis muscle
- splenius cervicis muscle
- semispinalis capitis muscle
- erector spinae muscle
  - spinalis
  - longissimus
  - iliocostalis